represents the climax forest of the region. (3) Then comes a mixed forest occupying only some 6 per cent of the wooded area and made up partly of a combination of the previously mentioned types and partly of a swamp type in which *Fraxinus nigra*, *Thuja occidentalis*, and *Abies balsamea* are dominant. (4) Finally, there are areas formerly mostly pine forests, but repeatedly burned after cutting and now occupied by a pioneer association dominated by *Populus tremuloides* and *Betula alba*. It comprises some 56 per cent of the forested area, occupying the thin soils over the granitic or crystalline rocks or the deeper sandy plains and sandy ridges. While potentially pine forest areas, these poplar-birch forests are usually so entirely without pine that only by a system of planting could they be brought to their original richly productive condition.

HOWE reviews at some length the economic loss involved in the forest fires so prevalent in the past and still occurring annually over this region, and shows the true economy of the preventive measures he recommends.

A discussion of the economic and industrial conditions by WHITE and an introduction by FERNOW both show the futility of attempting agriculture in a region so little suited to crop production, and the great importance of having it organized into a forest reserve under government control with scientific supervision.

The illustrations, the excellent index, and the mapping of the distribution of the forest types described all add to the value of the report.—GEO. D. FULLER.

**Paleobotanical notes.**—SEWARD[22] has published an account of the antarctic ("Terra nova") fossil plants collected by the British Antarctic Expedition of 1910, being the first of the geological memoirs completed. A general account of the various expeditions to this region is given, followed by a description of the paleobotanical material secured, much of it being too fragmentary for certain identification. Among the descriptions are two new genera, obtained from what are probably Mesozoic beds: *Antarcticoxylon* (presumably the stem of a gymnosperm) and *Pityosporites* (thought to be a winged pollen grain of some gymnosperm). Various remains of *Glossopteris* were also identified, and the occurrence of this genus in the antarctic regions suggests a general discussion of the wide uniformity of climatic conditions during the later Paleozoic.

SEWARD,[23] in another paper discussing the Wealden floras, calls attention to the surprising similarity in the general appearance of the floras of Japan, South Africa, North America, South America, Europe, and the Arctic regions. "In the Wealden period the type of vegetation was very similar to that which flourished through the greater part of the world during the whole of the Jurassic,

[22] SEWARD, A. C., Antarctic fossil plants. British Museum, Brit. Antarctic Exped. 1910. Geol. 1:1–49. *pls. 1–8.* 1914.

[23] ———, Wealden floras. Hastings and East Sussex Nat. 2:126–142. *pl. 2.* 1914.

and very shortly after the Wealden the vegetation of the world experienced a very remarkable transformation."

WIELAND[24] has investigated the problematical fossil *Cryptozoon*, and the much discussed question of the origin of the oolites. Oolites and *Cryptozoon* are said to be notable features of the Ozarkian. According to WIELAND, *Cryptozoon* is a marine alga "which formed vast reefs in the Ozarkian oceans"; and in connection with a description of a new species of *Cryptozoon* from Pennsylvania, and the general occurrence of similar forms (as *Eozoon*, for example) in the early Paleozoic, he concludes that the hypothetical "age of seaweeds" preceding the coal plants is a reality.

BERRY[25] has contrasted the ancestry of our present walnuts and hickories, so far as they can be recognized as fossils, back to the Middle Cretaceous, and presents evidence that at this remote period their geographical range and their abundance were much greater than now. This evidence also enables him to explain the geographical distribution of the living representatives of the family.—J. M. C.

**Slope-direction and forest distribution.**—TURESSON[26] points out that *Pseudotsuga taxifolia* (Douglas spruce or red fir) is confined to north-facing slopes in the Spokane region in eastern Washington. He says "the evidences have shown that exposure is the regulating factor in the distribution of the tree in this region, the northern slopes and ridges being the only localities which offer the needed humidity in soil and atmosphere." He adds "not only around Spokane but in all more or less arid regions can this be observed." He cites from his own observations and from literature several instances illustrating the fact that the southern slope tends to be more xerophytic than the northern. After calling attention to the fact that this tree reaches its best development in the Puget Sound region, he cites COWLES[27] to indicate that near its areal limits a species "can grow only in those formations which resemble most closely in an edaphic way the climatic features at the distribution center." Speaking of the distribution of this tree in the San Juan Islands, he calls attention to the similarity in climate between these islands and the Spokane region. He then says "it is not surprising to find *Pseudotsuga taxifolia* confined to the northern slopes of the hills in these islands." Quoting from a paper by the reviewer,[28]

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[24] WIELAND, G. R., Further notes on Ozarkian seaweeds and oolites. Bull. Amer. Mus. Nat. Hist. **33**:237–360. *pls. 14–19.* 1914.

[25] BERRY, EDWARD W., Notes on the geological history of the walnuts and hickories. Smithsonian Report for 1913. pp. 319–331. 1914.

[26] TURESSON, G., Slope exposure as a factor in the distribution of *Pseudotsuga taxifolia* in eastern Washington. Bull. Torr. Bot. Club **41**:337–345. 1914.

[27] COWLES, H. C., The physiographic ecology of Chicago and vicinity. BOT. GAZ. **31**:73–108, 145–182. 1901.

[28] RIGG, G. B., Forest distribution in the San Juan Islands: a preliminary note. Plant World **16**:177–182. 1913.